

**What is claimed is**

1. An integrated microfluidic electrospray chip system, comprising at least:
  - a microfluidic chip having a plurality of microchannels provided thereon for separation of samples;
  - 5 an electrospray nozzle connected to said microfluidic chip for ionization of samples;
  - a hydrolysis unit for the hydrolysis of samples;
  - a solid-phase extraction unit for concentration and purification of samples;
  - a mass spectrometer for analysis and/or identification of samples; and
  - 10 a power supply to supply system voltages for use in electrophoresis and electrospray ionization.
2. The chip system according to Claim 1, wherein said microfluidic chip has a plurality of microchannels and fluid reservoirs provided thereon for feeding and separation of samples.
- 15 3. The chip system according to Claim 1, wherein said microfluidic chip may be made of quartz, glass, silicon chip, polymer or other material having identical effect.
4. The chip system according to Claim 2, wherein said electrospray nozzle is connected to the end of one of said fluid reservoirs used for storing the separated sample in said microfluidic chip.
- 20 5. The chip system according to Claim 1, wherein said hydrolysis unit consists of a cartridge-filled proteinase.
6. The chip system according to Claim 5, wherein said proteinase is trypsin.

7. The chip system according to Claim 1, wherein said solid-phase extraction unit is packed with Oligo R3 bead or C18 bead or any stationary phase applicable in liquid chromatography.

5 8. The chip system according to Claim 1, wherein said solid-phase extraction unit consists of a loop packed with stationary phases.

9. The chip system according to Claim 1, wherein said loop is connected to an injector.

10. The chip system according to Claim 1, wherein said electrospray nozzle consists of fused silica capillaries.

10 11. A chip system according to Claim 1, wherein said system integrates proteinase reaction, solid-phase extraction mechanism, electrophoresis and mass spectrometry for protein identification.

12. A method for rapid identification of protein using an integrated microfluidic electrospray chip system, comprising at least the steps of:

15 feeding a sample into a hydrolysis unit to undergo hydrolysis reaction;

feeding the hydrolyzed sample into a solid-phase extraction unit to undergo solid-phase extraction;

feeding the hydrolyzed and solid-phase extracted sample to a microfluidic chip to undergo electrophoretic separation;

20 feeding the separated sample into a electrospray nozzle to ionize the sample; and

feeding the ionized sample into a mass spectrometer for analysis and identification.

13. The method according to Claim 12, wherein said microfluidic chip has a

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plurality of microchannels and fluid reservoirs provided thereon for feeding and separation of samples.

14. The method according to Claim 12, wherein said microfluidic chip may be made of quartz, glass, silicon chip, polymer or other material having identical effects.

5        15. The method according to Claim 12, wherein said electrospray nozzle is connected to the end of one of said fluid reservoirs used for storing the separated sample in said microfluidic chip.

16. The method according to Claim 12, wherein said hydrolysis unit consists of a cartridge-filled proteinase.

10        17. The method according to Claim 16, wherein said proteinase is trypsin.

18. The method according to Claim 12, wherein said solid-phase extraction unit is packed with Oligo R3 bead or C18 bead or any stationary phase applicable in liquid chromatography.

15        19. The method according to Claim 12, wherein said solid-phase extraction unit consists of a loop packed with stationary phases.